



First 50 Days of FAME

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Mission Timeline Features



- **Mission Phases**
 - **Launch**
 - **Geosynchronous Transfer Orbit (GTO)**
 - **SubSync**
 - **Phasing Orbits**
 - **Geo/mission/nominal**
 - **EE&C**
 - **Science**
 - **Disposal**
- **All Times in UTC**
- **Detailed Timeline Presentation for Launch Through EE&C**
- **Use BP Whenever in View**
 - **Supplement With DSN Madrid and Canberra (Goldstone, California View Is About the Same As BP)**
- **Sun Angle Is wrt +Z Axis of Spacecraft Bus**



Launch Phase Events



Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)	Notes	GS
	Launch	10/30/04	21:27:00	00:00:00:00	10/30/2004 21:27	
	MECO	10/30/04	21:31:21	00:00:04:21		
	Stage I/II separation	10/30/04	21:31:29	00:00:00:08		
	Stage II Ignition	10/30/04	21:31:34	00:00:00:14		
	Fairing separation	10/30/04	21:32:00	00:00:00:39		
	SECO 1	10/30/04	21:38:16	00:00:06:55		
	Stage II engine restart	10/30/04	22:11:47	00:00:10:10		
	SECO 2	10/30/04	22:12:08	00:00:10:31		
	1st view from Ground Station @ Canberra (DSN)	10/30/04	22:12:36	00:09:26:15		CAN
	Spin up launch vehicle	10/30/04	22:12:58	00:00:00:50	Spin rate = TBD (low) rpm	
	Stage II/III separation	10/30/04	22:13:01	00:00:00:53		
	Stage III ignition	10/30/04	22:13:38	00:00:01:30		
	Stage III burnout	10/30/04	22:15:05	00:00:02:57		
155	Spacecraft-LV separation	10/30/04	22:16:58	00:00:04:50	LV pointing attitude \pm TBD (5, 10, 20) degrees	



GTO Phase (1 of 3)



Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)	Notes	GS
	Activation of S/C	10/30/04	22:18:02	00:00:10:00	Verify bus SOH; begin active ranging	CAN
	Enable instrument survival heaters	10/30/04	22:28:02	00:00:00:30		CAN
	Power spinning sun sensor and IMUs	10/30/04	22:28:32	00:00:01:00		CAN
	Activate Closed Loop Spin (CLS); Remove tipoff rate; Adjust spin rate	10/30/04	22:29:32	00:00:02:00	LV spin rate=0±5rpm	CAN
	Activate Active Nutation Control (ANC mode)	10/30/04	22:31:32	00:00:02:00		CAN
135-170	Change mode to Spin Axis Precession (SAP), if needed	10/30/04	22:33:32	00:00:02:00	To correct sun angle; want 135-170 degrees from +Z _{bus}	CAN
	Change mode to ANC	10/30/04	22:35:32	00:00:02:00		CAN
	Turn on star trackers	10/30/04	22:36:32	00:00:01:00		CAN
	Open star tracker covers	10/30/04	22:37:32	00:00:05:00		CAN
	Change to CLS; spin down	10/30/04	22:42:32	00:00:05:00		CAN
	Obtain attitude fix	10/30/04	22:47:32	00:00:01:00		CAN
	Upload apogee trim maneuver (ATM) schedule	10/31/04	3:23:24	00:00:10:00	Occurs 5 hours before ATM burn; One orbit = 10.6 hours	CAN
	Change mode to Inertial Pointing & slew to ATM attitude	10/31/04	7:23:24	00:00:10:00	Occurs within 1 hour of ATM burn	CAN
	Canberra LOS	10/31/04	7:38:51			CAN



GTO Phase (2 of 3)



Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)	Notes	GS
104 or 284	Perform ATM (at perigee)	10/31/04	8:23:24	00:00:03:58	MET is fixed	
	End ATM burn	10/31/04	8:27:22			
	Slew back to sun pointing attitude	10/31/04	8:27:22	00:00:10:00		
	Change mode to CLS; spin up to ~1rpm	10/31/04	8:37:22	00:00:02:00		
	1st view from Ground Station @ Madrid (DSN)	10/31/04	8:50:58	00:09:31:56		MAD
155±20	Change mode to ANC; power off star trackers; verify orbit	10/31/04	9:00:58	00:12:00:00	Starts 10 min after AOS; gather about 12hrs of tracking data	MAD
	1st view from Ground Station @ BP	10/31/04	13:07:25	00:04:32:26		BP/MAD
	LOS @ BP	10/31/04	17:39:51			BP/MAD
	LOS @ Madrid	10/31/04	18:22:54			BP/MAD
	AOS @ Canberra	10/31/04	18:48:16	00:00:09:56		CAN
	LOS @ Canberra	10/31/04	18:58:12			CAN
	AOS @ BP	10/31/04	19:38:27	00:13:00:50		BP
	Upload AKM burn script	10/31/04	19:56:55	00:00:05:00	Occurs within 4 hours of AKM burn	BP
	Turn on star trackers	10/31/04	20:56:55	00:00:05:00	Occurs within 3 hours of AKM burn	BP
	Change mode to CLS; spin down	10/31/04	21:01:55	00:00:02:00		BP
	Obtain attitude fix	10/31/04	21:03:55	00:00:01:00		BP
	Change mode to Inertial Pointing & slew to AKM burn attitude	10/31/04	21:04:55	00:00:10:00		BP
	Power off star trackers	10/31/04	21:14:55	00:00:06:00		BP
	Change mode to CLS to spin up to 10 rpm	10/31/04	21:14:55	00:00:02:00		BP
	Change mode to ANC	10/31/04	21:16:55	00:00:30:00		BP



GTO Phase (3 of 3)



Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)	Notes	GS
	Change mode to SAP, if necessary	10/31/04	21:46:55	00:00:02:00		BP
	Change mode to ANC	10/31/04	21:48:55	00:00:01:00		BP
	Change mode to CLS to spin up to 60 rpm	10/31/04	21:49:55	00:00:04:00		BP
	Change mode to ANC	10/31/04	21:53:55	00:00:02:00		BP
	Change mode to SAP, if necessary	10/31/04	21:55:55	00:00:01:00		BP
	Change mode to ANC	10/31/04	21:56:55	00:00:02:00		BP
	Verify AKM burn script; upload again if needed	10/31/04	22:06:55	00:00:10:00		BP
135	Change to CLS; start AKM burn	10/31/04	23:56:55	00:00:00:55	MET is fixed; SA=145 degrees from Z _{bus} -axis	BP
	End AKM burn	10/31/04	23:57:50	00:00:00:00		BP



SubSync Phase (1 of 3)



Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)	Notes	GS
	Activation of S/C	10/31/04	22:18:02	00:00:10:00	Verify bus SOH; begin active ranging	CAN
	Enable instrument survival heaters	10/30/04	22:28:02	00:00:00:30		CAN
	Power spinning sun sensor and IMUs	10/30/04	22:28:32	00:00:01:00		CAN
	Activate Closed Loop Spin (CLS); Remove tipoff rate; Adjust spin rate	10/30/04	22:29:32	00:00:02:00	LV spin rate=0 \pm 5rpm	CAN
	Activate Active Nutation Control (ANC mode)	10/30/04	22:31:32	00:00:02:00		CAN
135-170	Change mode to Spin Axis Precession (SAP), if needed	10/30/04	22:33:32	00:00:02:00	To correct sun angle; want 135-170 degrees from +Z _{bus}	CAN
	Change mode to ANC	10/30/04	22:35:32	00:00:02:00		CAN
	Turn on star trackers	10/30/04	22:36:32	00:00:01:00		CAN
	Open star tracker covers	10/30/04	22:37:32	00:00:05:00		CAN
	Change to CLS; spin down	10/30/04	22:42:32	00:00:05:00		CAN
	Obtain attitude fix	10/30/04	22:47:32	00:00:01:00		CAN
	Upload apogee trim maneuver (ATM) schedule	10/31/04	3:23:24	00:00:10:00	Occurs 5 hours before ATM burn; One orbit = 10.6 hours	CAN
	Change mode to Inertial Pointing & slew to ATM attitude	10/31/04	7:23:24	00:00:10:00	Occurs within 1 hour of ATM burn	CAN
	Canberra LOS	10/31/04	7:38:51			CAN



SubSync Phase (2 of 3)



Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)	Notes	GS
104 or 284	Perform ATM (at perigee)	10/31/04	8:23:24	00:00:03:58	MET is fixed	
	End ATM burn	10/31/04	8:27:22			
	Slew back to sun pointing attitude	10/31/04	8:27:22	00:00:10:00		
	Change mode to CLS; spin up to ~1rpm	10/31/04	8:37:22	00:00:02:00		
	1st view from Ground Station @ Madrid (DSN)	10/31/04	8:50:58	00:09:31:56		MAD
155±20	Change mode to ANC; power off star trackers; verify orbit	10/31/04	9:00:58	00:12:00:00	Starts 10 min after AOS; gather about 12hrs of tracking data	MAD
	1st view from Ground Station @ BP	10/31/04	13:07:25	00:04:32:26		BP/MAD
	LOS @ BP	10/31/04	17:39:51			BP/MAD
	LOS @ Madrid	10/31/04	18:22:54			BP/MAD
	AOS @ Canberra	10/31/04	18:48:16	00:00:09:56		CAN
	LOS @ Canberra	10/31/04	18:58:12			CAN
	AOS @ BP	10/31/04	19:38:27	00:13:00:50		BP
	Upload AKM burn script	10/31/04	19:56:55	00:00:05:00	Occurs within 4 hours of AKM burn	BP
	Turn on star trackers	10/31/04	20:56:55	00:00:05:00	Occurs within 3 hours of AKM burn	BP



SubSync Phase (3 of 3)



Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)	Notes	GS
	Change mode to CLS; spin down	10/31/04	21:01:55	00:00:02:00		BP
	Obtain attitude fix	10/31/04	21:03:55	00:00:01:00		BP
	Change mode to Inertial Pointing & slew to AKM burn attitude	10/31/04	21:04:55	00:00:10:00		BP
	Power off star trackers	10/31/04	21:14:55	00:00:06:00		BP
	Change mode to CLS to spin up to 10 rpm	10/31/04	21:14:55	00:00:02:00		BP
	Change mode to ANC	10/31/04	21:16:55	00:00:30:00		BP
	Change mode to SAP, if necessary	10/31/04	21:46:55	00:00:02:00		BP
	Change mode to ANC	10/31/04	21:48:55	00:00:01:00		BP
	Change mode to CLS to spin up to 60 rpm	10/31/04	21:49:55	00:00:04:00		BP
	Change mode to ANC	10/31/04	21:53:55	00:00:02:00		BP
	Change mode to SAP, if necessary	10/31/04	21:55:55	00:00:01:00		BP
	Change mode to ANC	10/31/04	21:56:55	00:00:02:00		BP
	Verify AKM burn script; upload again if needed	10/31/04	22:06:55	00:00:10:00		BP
135	Change to CLS; start AKM burn	10/31/04	23:56:55	00:00:00:55	MET is fixed; SA=145 degrees from Z _{bus} -axis	BP
	End AKM burn	10/31/04	23:57:50	00:00:00:00		BP



GEO (1 of 3)



Mission Phase	Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)
GEO EE&C		Spin Rate Control With Sun @ 45 Deg To -Z-Axis	12/16/04	2:01:07	00:00:02:00
		Star Tracker Covers Open, Instrument Covers Closed	12/16/04	2:03:07	00:00:02:00
		Set Trim Masses, Trim Tabs & Trim Areas To Nominal Positions	12/16/04	2:05:07	00:02:00:00
		Enter Normal Mode With Nutation Damping, Spin Rate Control & Sun Angle Control	12/16/04	4:05:07	01:00:00:00
Start Precession Rate Balance		Stable Spinning For IMU & ST Data Collection	12/17/04	4:05:07	02:00:00:00
		Adjust Trim Tabs For Precession Rate Control	12/19/04	4:05:07	00:00:02:00
		Stable Spinning For IMU & ST Data Collection	12/19/04	4:07:07	02:00:00:00
		Repeat Trim Tab Adjustment & Data Collection As Needed Until Balanced	12/21/04		TBD
Start Dynamic Balance		Spin-Up To 20 &/Or 10 (TBR) Min Spin Period	12/21/04	4:07:07	01:00:00:00
		Stable Spinning For IMU Data Collection	12/22/04	4:07:07	00:02:00:00
		Adjust Trim Masses For Dynamic Balance	12/24/04	6:07:07	00:00:02:00
		Stable Spinning For IMU Data Collection	12/24/04	6:09:07	00:02:00:00
		Repeat Trim Mass Adjustment & Data Collection As Needed Until Balanced	12/26/04		TBD
		Spin-Down To 40 Min Spin Period	12/26/04	8:09:07	01:00:00:00

- **BP Has View 24/7**
- **Sun Angle Is 135°**



GEO (2 of 3)



Mission Phase	Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)
Start Static Balance		Stable Spinning For IMU & ST Data Collection	12/27/04	8:09:07	00:02:00:00
		Adjust Trim Areas For CP-CM Balance	12/27/04	10:09:07	00:00:02:00
		Stable Spinning For IMU & ST Data Collection	12/27/04	10:11:07	02:00:00:00
		Repeat Trim Area Adjustment & Data Collection As Needed Until Balanced	12/29/04		TBD
Start Instrument/Attitude System Alignment Process		Star Tracker Covers Open, One Instrument Cover Open	12/29/04	10:11:07	00:00:02:00
		Adjust Trim Masses & Trim Areas To Account For Instrument Cover Change	12/29/04	10:13:07	00:00:02:00
		Perform Instrument Related Instrument Activities As Needed At This Time	12/29/04	10:15:07	01:00:00:00
		Command Instrument To Engineering Mode & Set TDI	12/30/04	10:15:07	00:00:02:00
		Command Instrument To Dump 1/2 CCD Image With Time Tag	12/30/04	10:17:07	00:00:02:00
		Ground Ops & Upload Updated Alignment Matrix For Instrument	12/30/04	10:19:07	00:02:00:00
		Star Tracker Covers Open & Both Instrument Covers Open	12/30/04	12:19:07	00:00:02:00
		Adjust Trim Masses & Trim Areas To Account For Instrument Cover Change	12/30/04	12:21:07	00:00:02:00
		Perform Instrument Related Activities As Needed At This Time	12/30/04	12:23:07	01:00:00:00



GEO (3 of 3)



Mission Phase	Sun Angle (degrees)	Key Events	Date	UTC (hh:mm:ss)	Duration (dd:hh:mm:ss)
		Command Instrument To Engineering Mode & Set TDI	12/31/04	12:23:07	00:00:02:00
		Command Instrument To Dump 1/2 CCD Image With Time Tag	12/31/04	12:25:07	00:00:02:00
		Ground Ops & Upload Updated Alignment Matrix For Instrument	12/31/04	12:27:07	00:02:00:00
		Command Instrument Acquisition To Test New Alignment	12/31/04	14:27:07	00:00:02:00
		Instrument Transitions To Science Mode	12/31/04	14:29:07	00:00:02:00
		Repeat Data Collection & Alignment Updates As Needed Until Aligned	12/31/04		TBD
Start Final Balance		Command Instrument To Standby & Then To Trim Mode	12/31/04	14:31:07	00:00:02:00
		Dump Guide Or Acquisition Star Images For Fine Spacecraft Balance	12/31/04	14:33:07	00:02:00:00
		Ground Ops & Adjust Trim Masses & Trim Areas For Fine Balance	12/31/04	16:33:07	00:02:00:00
		Repeat Data Collection & Adjustments As Needed Until Balanced	12/31/04	18:33:07	TBD